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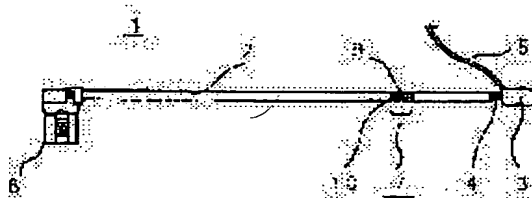
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## (54) METHOD FOR PREVENTING HARDENING OF MOTOR LEAD WIRE BY VARNISH TREATMENT

## (57)Abstract

**PROBLEM TO BE SOLVED:** To prevent hardening of a lead wire by preventing varnish from permeating into the lead wire due to capillary phenomenon, when an enclosed compressor motor is treated with varnish.

**SOLUTION:** The lead wire, which is the one for the enclosed compressor motor to be treated with varnish, comprises a protective cover and core wires made up of a plurality of element wires and has a connecting part at one end to be connected with a motor winding and a terminal, and at the other to be connected with a power supply. This method is for preventing hardening of the motor lead wire, to preventing the permeation of the varnish into the lead wire by providing a cover-removed portion, where the core wires are disposed between the connecting part and the terminal, and by performing the varnish treatment, after filling with an anti-coolant resin the spaces among the element wires of the cover-removed portion and the space between the protective cover and the core wires of the terminal side on this lead wire.



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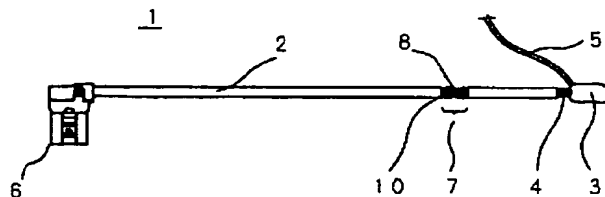
SS15 SS33 TT26

(54) 【発明の名称】 ワニス処理によるモーターリード線の硬化を防止する方法

(57) 【要約】

【課題】 密閉型コンプレッサ用モータのワニス処理時において、リード線の毛細管現象によるワニスの浸透を防ぐことによりリード線の硬化を防止する。

【解決手段】 ワニス処理を施す密閉型コンプレッサ用モータのリード線であって、保護被覆および複数の素線からなる芯線を備え、一端にはモータ巻線と接続する接続部を有し、他端には電源接続用の端子を有したリード線において、前記接続部と前記端子との間に芯線を露出させた被覆除去部を設け、この被覆除去部の素線間の隙間および前記端子側の保護被覆と芯線間の隙間に耐冷媒用樹脂を充填した後、ワニス処理を行うことによりワニスの浸透を防ぐモーターリード線の硬化を防止する方法。



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## 【特許請求の範囲】

【請求項 1】 ワニス処理を施す密閉型コンプレッサ用モータのリード線であって、保護被覆および複数の素線からなる芯線を備え、一端にはモータ巻線と接続する接続部を有し、他端には電源接続用の端子を有したリード線において、前記接続部と前記端子との間に芯線を露出させた被覆除去部を設け、この被覆除去部の素線間の隙間および前記端子側の保護被覆と芯線間の隙間に耐冷媒用樹脂を充填した後、ワニス処理を行うことを特徴とするワニス処理によるモータリード線の硬化を防止する方法。

【請求項 2】 ワニス処理を施す密閉型コンプレッサ用モータのリード線であって、保護被覆および複数の素線からなる芯線を備え、一端にはモータ巻線と接続する接続部を有し、他端には電源接続用の端子を有したリード線において、前記接続部と前記端子との間に芯線を露出させた被覆除去部を設け、この被覆除去部の素線間の隙間および前記端子側の保護被覆と芯線間の隙間にハンダを充填した後、ワニス処理を行うことを特徴とするワニス処理によるモータリード線の硬化を防止する方法。

【請求項 3】 ワニス処理を施す密閉型コンプレッサ用モータのリード線であって、保護被覆および複数の素線からなる芯線を備え、一端にはモータ巻線と接続する接続部を有し、他端には電源接続用の端子を有したリード線において、前記接続部と前記端子との間に、前記素線間の隙間および前記保護被覆と芯線間の隙間を圧接により潰した後、ワニス処理を行うことを特徴とするワニス処理によるモータリード線の硬化を防止する方法。

【請求項 4】 被覆除去部、又は圧接の位置は、リード線の最終結束固定部と前記接続部との間に設けたことを特徴とする請求項 1 ないし請求項 3 のいずれかに記載のワニス処理によるモータリード線の硬化を防止する方法。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、ワニス処理を施す密閉型コンプレッサ用モータにおいて、ワニス処理によるモータリード線の硬化を防止する方法に関するものである。

## 【0002】

【従来の技術】モータの巻線にワニス処理を施す問題点は、処理の際リード線にワニスが浸透し硬化することである。このリード線の硬化によりコンプレッサの組立工程の作業性低下、および可撓性低下によるリード線劣化、モータ焼損等重大な欠陥となるおそれがあった。

【0003】リード線が硬化する要因は、巻線にワニスを塗布する際、巻線とリード線との接続部から、リード線の毛細管現象によりワニスがリード線に浸透し硬化するからである。

【0004】これを防ぐため、従来ワニス処理を施す密

閉型コンプレッサ用モータには、特開平 9-135551 号公報に記載されているように、リード線にかからないようにワニスを塗布するか、前記接続部をハンダや収縮チューブ等により密閉し、ワニスの浸透を防ぐ対策が取られていた。しかし、リード線にかからないようにワニスを塗布するのは手間がかかり、また、前記接続部は巻線が接続され形状が複雑で保護被覆に近く、ハンダや収縮チューブ等により密閉するのが難しい問題があった。

## 【0005】

【発明が解決しようとする課題】本発明は、密閉型コンプレッサ用モータのワニス処理時において、リード線の毛細管現象によるワニスの浸透を防ぐことによりリード線の硬化を防止する方法を提供するものである。

## 【0006】

【課題を解決するための手段】上記課題を解決するため、請求項 1 にかかる発明は、ワニス処理を施す密閉型コンプレッサ用モータのリード線であって、保護被覆および複数の素線からなる芯線を備え、一端にはモータ巻線と接続する接続部を有し、他端には電源接続用の端子を有したリード線において、前記接続部と前記端子との間に芯線を露出させた被覆除去部を設け、この被覆除去部の素線間の隙間および前記端子側の保護被覆と芯線間の隙間に耐冷媒用樹脂を充填し、リード線の毛細管現象によるワニスの浸透を防ぐモータリード線の硬化を防止する方法である。

【0007】請求項 2 にかかる発明は、ワニス処理を施す密閉型コンプレッサ用モータのリード線であって、保護被覆および複数の素線からなる芯線を備え、一端にはモータ巻線と接続する接続部を有し、他端には電源接続用の端子を有したリード線において、前記接続部と前記端子との間に芯線を露出させた被覆除去部を設け、この被覆除去部の素線間の隙間および前記端子側の保護被覆と芯線間の隙間にハンダを充填し、リード線の毛細管現象によるワニスの浸透を防ぐモータリード線の硬化を防止する方法である。

【0008】請求項 3 にかかる発明は、ワニス処理を施す密閉型コンプレッサ用モータのリード線であって、保護被覆および複数の素線からなる芯線を備え、一端にはモータ巻線と接続する接続部を有し、他端には電源接続用の端子を有したリード線において、接続部と端子との間に、素線間の隙間および保護被覆と芯線間の隙間を圧接により潰して、リード線の毛細管現象によるワニスの浸透を防ぐモータリード線の硬化を防止する方法である。

【0009】請求項 4 にかかる発明は、被覆除去部、又は圧接の位置を、リード線の最終結束固定部と接続部との間に設けたことにより、リード線の毛細管現象によるワニスの浸透を防ぐモータリード線の硬化を防止する方法である。

【0010】

【発明の実施の形態】以下本発明の実施の形態を図面に基づき説明する。図5はモータの固定子20を示している。モータの固定子20は、巻線5に接続されているリード線1が最終結束固定部11にて固定されている。さらに、図1はこのリード線1を表し、保護被覆2を有するリード線1の一端は接続部3でリード線1の芯線4がモータ巻線5に接続され、他端は電源に接続のための端子6に接続されていることを示す。モータ巻線との接続部3と電源接続のための端子6との間の保護被覆2に被覆除去部7を設け、被覆除去部7と端子側保護被覆2との境目10において、耐冷媒用樹脂により素線間の隙間および端子側の保護被覆と芯線間の隙間を充填している。リード線の隙間がなくなること、その後のワニス処理時に、リード線の毛細管現象によるワニスの浸透を防止できるものである。耐冷媒用樹脂によりリード線の隙間がなくなっている状態を、被覆除去部7と端子側保護被覆2との境目10のリード線断面により図2に示す。リード線4の素線9間の隙間および端子側の保護被覆2と芯線4間の隙間が耐冷媒用樹脂8により充填されている。ここで、耐冷媒用樹脂としては、PBT樹脂やフェノール樹脂等の材料が推奨される。

【0011】これにより、被覆除去部によりリード線保護被覆へのワニスの浸透も防止できる。また、本発明は固定子に使用する温度保護素子等のリード線にも応用できる。

【0012】さらに、被覆除去部を密閉化する材料をハンダとすれば、ハンダは接続部に使用しているなど一般に手配が容易で使用に慣れており、容易にリード線の芯線からの毛細管現象によるワニスの浸透を防止できるものである。なお、ハンダは電導体であるため、密閉化処理した部分の周囲に絶縁物を巻いても良い。

【0013】また、圧力を掛けると変形し圧力を取り去った後も形状を保持する図3に示す部品12を使い、リード線の密閉化する位置に前記部品を通し圧力を掛け、リード線素線間の隙間および保護被覆と芯線間の隙間を圧接により潰して、リード線の毛細管現象によるワニスの浸透を防ぎ、モータリード線の硬化の問題を防ぐことができる。圧接した状態をリード線長さ方向の断面により図4に示す。

【0014】リード線の硬化が問題となるのは、モータの固定子を表す図5において、リード線の最終結束固定部11から端子6の間であり、固定部11からモータ巻線5との接続部までの間に密閉化の位置を設ければ、リード線の硬化の問題を防ぐことが可能になる。したがって、密閉化の位置を、リード線の最終結束固定部とモータ巻線との接続部の間に設けたことによって、より有効に、リード線の毛細管現象によるワニスの浸透を防ぎ、モータリード線の硬化の問題を防ぐことができる。

【0015】

【発明の効果】以上説明したように請求項1の発明によれば、ワニス処理を施す密閉型コンプレッサ用モータのリード線であって、保護被覆および複数の素線からなる芯線を備え、一端にはモータ巻線と接続する接続部を有し、他端には電源接続用の端子を有したリード線において、前記接続部と前記端子との間に芯線を露出させた被覆除去部を設け、この被覆除去部の素線間の隙間および前記端子側の保護被覆と芯線間の隙間に耐冷媒用樹脂を充填することにより、ワニス処理時にリード線の接続部から毛細管現象によるワニスの浸透を防ぎ、モータリード線の硬化の問題を防ぐことが可能になる。

【0016】請求項2の発明によれば、ワニス処理を施す密閉型コンプレッサ用モータのリード線であって、保護被覆および複数の素線からなる芯線を備え、一端にはモータ巻線と接続する接続部を有し、他端には電源接続用の端子を有したリード線において、前記接続部と前記端子との間に芯線を露出させた被覆除去部を設け、この被覆除去部の素線間の隙間および前記端子側の保護被覆と芯線間の隙間にハンダを充填することにより、ワニス処理時にリード線の接続部から毛細管現象によるワニスの浸透を防ぎ、モータリード線の硬化の問題を防ぐことが可能になる。

【0017】請求項3の発明によれば、ワニス処理を施す密閉型コンプレッサ用モータのリード線であって、保護被覆および複数の素線からなる芯線を備え、一端にはモータ巻線と接続する接続部を有し、他端には電源接続用の端子を有したリード線において、接続部と端子との間に、素線間の隙間および保護被覆と芯線間の隙間を圧接により潰してリード線の毛細管現象によるワニスの浸透を防ぎ、モータリード線の硬化の問題を防ぐことが可能になる。

【0018】リード線の硬化が問題となるのは、リード線の最終結束固定部から端子の間であり、リード線の最終結束固定部からモータ巻線との接続部までの間に被覆除去部、又は圧接の位置を設ければ、リード線の硬化の問題を防ぐことが可能になる。

【0019】従って、請求項4の発明によれば、被覆除去部、又は圧接の位置を、リード線の最終結束固定部とモータ巻線との接続部の間に設けたことによって、より有効にリード線の毛細管現象によるワニスの浸透を防ぎ、モータリード線の硬化の問題を防ぐことが可能になる。

【図面の簡単な説明】

【図1】本発明の実施例であるリード線を示す図。

【図2】本発明の実施例であるリード線の断面を示す図。

【図3】本発明の実施例である圧接に使用する部品を示す図。

【図4】本発明の実施例である圧接した被覆除去部の断面を示す図。

【図5】モータの固定子を示す図。

【符号の説明】

- 1 リード線
- 2 保護被覆
- 3 接続部
- 4 芯線
- 5 巻線
- 6 端子

\* 7 被覆除去部

8 耐冷媒用樹脂

9 素線

10 境目

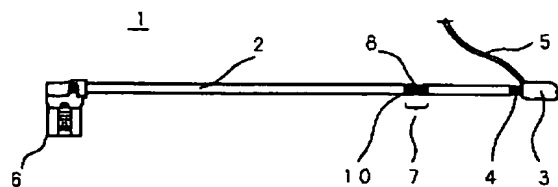
11 固定部

12 圧接に使用する部品

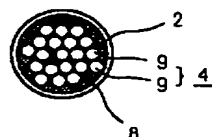
20 固定子

\*

【図1】



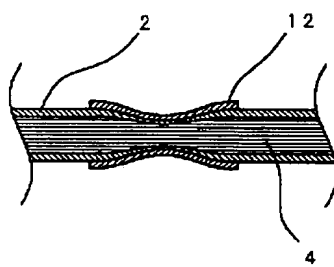
【図2】



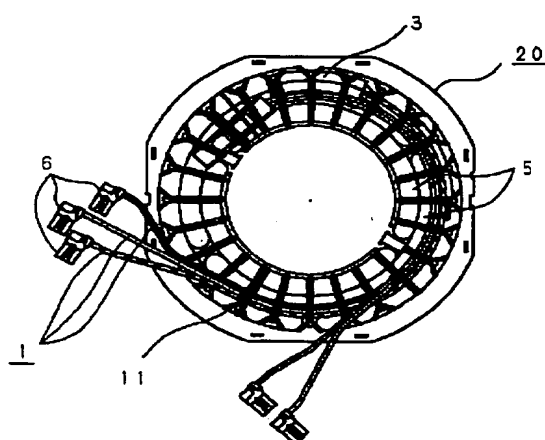
【図3】



【図4】



【図5】



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**CLAIMS**

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[Claim(s)]

[Claim 1] In lead wire with [ are the lead wire of the motor for closed mold compressors which performs varnish treated, have the core wire which consists of protective covering and two or more strands, have a connection linked to motor winding at the end, and ] the terminal for power-source connection in the other end The covering removal section in which the core wire was exposed is prepared between said connections and said terminals. How to prevent hardening of the motor lead wire by the varnish treated characterized by performing varnish treated after filling up the clearance between the strands of this covering removal section, and the protective covering by the side of said terminal and the clearance between core wires with the resin for refrigerants-proof.

[Claim 2] In lead wire with [ are the lead wire of the motor for closed mold compressors which performs varnish treated, have the core wire which consists of protective covering and two or more strands, have a connection linked to motor winding at the end, and ] the terminal for power-source connection in the other end How to prevent hardening of the motor lead wire by the varnish treated characterized by performing varnish treated after preparing the covering removal section in which the core wire was exposed between said connections and said terminals and filling up the clearance between the strands of this covering removal section, and the protective covering by the side of said terminal and the clearance between core wires with a pewter.

[Claim 3] In lead wire with [ are the lead wire of the motor for closed mold compressors which performs varnish treated, have the core wire which consists of protective covering and two or more strands, have a connection linked to motor winding at the end and ] the terminal for power-source connection in the other end How to prevent hardening of the motor lead wire by the varnish treated characterized by performing varnish treated after crushing the clearance between said strands, and the clearance between said protective covering and core wires with a pressure welding between said connections and said terminals.

[Claim 4] The location of the covering removal section or a pressure welding is the approach of preventing hardening of the motor lead wire by the varnish treated according to claim 1 to 3 characterized by preparing between the last union fixed part of lead wire, and said connection.

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**DETAILED DESCRIPTION**

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**[Detailed Description of the Invention]****[0001]**

**[Field of the Invention]** This invention relates to the approach of preventing hardening of the motor lead wire by varnish treated, in the motor for closed mold compressors which performs varnish treated.

**[0002]**

**[Description of the Prior Art]** The trouble of performing varnish treated to the coil of a motor is a varnish's permeating and hardening to lead wire, in the case of processing. There was a possibility of becoming serious defects, such as lead-wire degradation by the workability fall and the flexible fall like the erector of a compressor and motor burning, by hardening of this lead wire.

**[0003]** In case the factor which lead wire hardens applies a varnish to a coil, it is because a varnish permeates lead wire by the capillarity of lead wire and it hardens from the connection of a coil and lead wire.

**[0004]** In order to prevent this, the varnish was applied to the motor for closed mold compressors which performs conventional varnish treated so that lead wire might not be started as indicated by JP,9-135551,A, or said connection was sealed with the pewter, the contraction tube, etc., and the measures which prevent osmosis of a varnish were taken. However, applying a varnish required time and effort so that lead wire might not be started, and the coil was connected, and said connection had the complicated configuration and had a problem with it difficult [ to seal with near, a pewter, a contraction tube, etc. to protective covering ].

**[0005]**

**[Problem(s) to be Solved by the Invention]** This invention offers the approach of preventing hardening of lead wire, by preventing osmosis of the varnish by the capillarity of lead wire in the time of the varnish treated of the motor for closed mold compressors.

**[0006]**

**[Means for Solving the Problem]** In order to solve the above-mentioned technical problem, invention concerning claim 1 In lead wire with [ are the lead wire of the motor for closed mold compressors which performs varnish treated, have the core wire which consists of protective covering and two or more strands, have a connection linked to motor winding at the end, and ] the terminal for power-source connection in the other end It is the approach of preventing hardening of the motor lead wire which prepares the covering removal section in which the core wire was exposed between said connections and said terminals, fills up the clearance between the strands of this covering removal section, and the protective covering by the side of said terminal and the clearance between core wires with the resin for refrigerants-proof, and prevents osmosis of the varnish by the capillarity of lead wire.

**[0007]** Invention concerning claim 2 is the lead wire of the motor for closed mold compressors which performs varnish treated. In lead wire with [ have the core wire which consists of protective covering and two or more strands, have a connection linked to motor winding at the end, and ] the terminal for power-source connection in the other end It is the approach of preventing hardening of the motor lead wire which prepares the covering removal section in which the core wire was exposed between said connections and said terminals, fills up the clearance between the strands of this covering removal section, and the protective covering by the side of said terminal and the clearance

between core wires with a pewter, and prevents osmosis of the varnish by the capillarity of lead wire.

[0008] Invention concerning claim 3 is the lead wire of the motor for closed mold compressors which performs varnish treated. In lead wire with [ have the core wire which consists of protective covering and two or more strands, have a connection linked to motor winding at the end, and ] the terminal for power-source connection in the other end It is the approach of preventing hardening of the motor lead wire which crushes the clearance between strands, and the clearance between protective covering and a core wire with a pressure welding between a connection and a terminal, and prevents osmosis of the varnish by the capillarity of lead wire.

[0009] Invention concerning claim 4 is the approach of preventing hardening of the motor lead wire which prevents osmosis of the varnish by the capillarity of lead wire, by having prepared the location of the covering removal section or a pressure welding between the last union fixed part of lead wire, and the connection.

[0010]

[Embodiment of the Invention] The gestalt of operation of this invention is explained based on a drawing below. Drawing 5 shows the stator 20 of a motor. The lead wire 1 by which the stator 20 of a motor is connected to the coil 5 is being fixed by the last union fixed part 11. Furthermore, it is shown that, as for the end of the lead wire 1 which drawing 1 expresses this lead wire 1, and has protective covering 2, the core wire 4 of lead wire 1 is connected to motor winding 5 by the connection 3, and the other end is connected to the terminal 6 for connection with a power source. The covering removal section 7 was formed in the protective covering 2 between the connection 3 with motor winding, and the terminal 6 for power-source connection, and it is filled up with the clearance between strands, and the protective covering by the side of a terminal and the clearance between core wires with the resin for refrigerants-proof in the boundary line 10 of the covering removal section 7 and the terminal side protective covering 2. By the clearance between lead wire being lost, osmosis of the varnish by the capillarity of lead wire can be prevented at the time of subsequent varnish treated. The lead-wire cross section of the boundary line 10 of the covering removal section 7 and the terminal side protective covering 2 shows the condition that the clearance between lead wire is lost with the resin for refrigerants-proof to drawing 2 . It fills up with the clearance between the strands 9 of lead wire 4, and the protective covering 2 by the side of a terminal and the clearance between core wires 4 with the resin 8 for refrigerants-proof. Here, ingredients, such as PBT resin and phenol resin, are recommended as resin for refrigerants-proof.

[0011] Thereby, osmosis of the varnish to lead-wire protective covering can also be prevented by the covering removal section. Moreover, this invention is applicable also to lead wire, such as a temperature protection component used for a stator.

[0012] Furthermore, generally it is easy to arrange for the pewter, then the pewter to use the ingredient which sealing-izes the covering removal section for a connection etc., it is used to use, and osmosis of the varnish by the capillarity from the core wire of lead wire can be prevented easily. In addition, since a pewter is a conductor, it may wind an insulating material around the perimeter of the sealing--ization-processed part.

[0013] Moreover, even after deforming if a pressure is put, and removing a pressure, the components 12 shown in drawing 3 holding a configuration can be used, a through pressure can be put for said component on the location which lead wire sealing-izes, the clearance between lead stroke lines and the clearance between protective covering and a core wire can be crushed with a pressure welding, osmosis of the varnish by the capillarity of lead wire can be prevented, and the problem of hardening of motor lead wire can be prevented. The cross section of the lead-wire die-length direction shows the condition of having carried out the pressure welding to drawing 4 .

[0014] It is in drawing 5 showing the stator of a motor that hardening of lead wire poses a problem from the last union fixed part 11 of lead wire to the terminal 6, and if the location of sealing-izing is established in from a fixed part 11 before a connection with motor winding 5, it will become possible to prevent the problem of hardening of lead wire. Therefore, by having prepared the location of sealing-izing between the connections of the last union fixed part of lead wire, and motor winding, more effectively, osmosis of the varnish by the capillarity of lead wire can be prevented, and the problem of hardening of motor lead wire can be prevented.



[0015]

[Effect of the Invention] As explained above, according to invention of claim 1, it is the lead wire of the motor for closed mold compressors which performs varnish treated. In lead wire with [ have the core wire which consists of protective covering and two or more strands, have a connection linked to motor winding at the end, and ] the terminal for power-source connection in the other end By preparing the covering removal section in which the core wire was exposed between said connections and said terminals, and filling up the clearance between the strands of this covering removal section, and the protective covering by the side of said terminal and the clearance between core wires with the resin for refrigerants-proof It becomes possible to protect osmosis of the varnish by capillarity from the connection of lead wire, and to prevent the problem of hardening of motor lead wire at the time of varnish treated.

[0016] According to invention of claim 2, it is the lead wire of the motor for closed mold compressors which performs varnish treated. In lead wire with [ have the core wire which consists of protective covering and two or more strands, have a connection linked to motor winding at the end, and ] the terminal for power-source connection in the other end By preparing the covering removal section in which the core wire was exposed between said connections and said terminals, and filling up the clearance between the strands of this covering removal section, and the protective covering by the side of said terminal and the clearance between core wires with a pewter It becomes possible to protect osmosis of the varnish by capillarity from the connection of lead wire, and to prevent the problem of hardening of motor lead wire at the time of varnish treated.

[0017] According to invention of claim 3, it is the lead wire of the motor for closed mold compressors which performs varnish treated. In lead wire with [ have the core wire which consists of protective covering and two or more strands, have a connection linked to motor winding at the end, and ] the terminal for power-source connection in the other end It becomes possible to crush the clearance between strands, and the clearance between protective covering and a core wire with a pressure welding between a connection and a terminal, to prevent osmosis of the varnish by the capillarity of lead wire to it, and to prevent the problem of hardening of motor lead wire to it.

[0018] It is from the last union fixed part of lead wire to a terminal that hardening of lead wire poses a problem, and if the location of the covering removal section or a pressure welding is established in from the last union fixed part of lead wire before a connection with motor winding, it will become possible to prevent the problem of hardening of lead wire.

[0019] Therefore, according to invention of claim 4, it becomes possible by having prepared the location of the covering removal section or a pressure welding between the connections of the last union fixed part of lead wire, and motor winding to prevent osmosis of the varnish by the capillarity of lead wire more effectively, and to prevent the problem of hardening of motor lead wire.

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[Translation done.]

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- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

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**DESCRIPTION OF DRAWINGS**

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[Brief Description of the Drawings]

[Drawing 1] Drawing showing the lead wire which is the example of this invention.

[Drawing 2] Drawing showing the cross section of the lead wire which is the example of this invention.

[Drawing 3] Drawing showing the components used for the pressure welding which is the example of this invention.

[Drawing 4] Drawing showing the cross section of the covering removal section which is the example of this invention, and which carried out the pressure welding.

[Drawing 5] Drawing showing the stator of a motor.

[Description of Notations]

- 1 Lead Wire
- 2 Protective Covering
- 3 Connection
- 4 Core Wire
- 5 Coil
- 6 Terminal
- 7 Covering Removal Section
- 8 Resin for Refrigerants-proof
- 9 Strand
- 10 Boundary Line
- 11 Fixed Part
- 12 Components Used for Pressure Welding
- 20 Stator

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[Translation done.]

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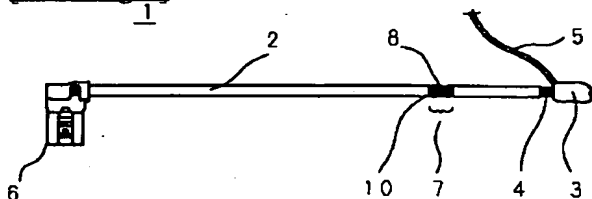
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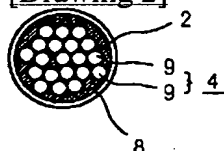
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DRAWINGS

[Drawing 1]



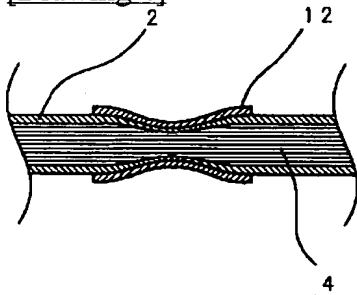
[Drawing 2]



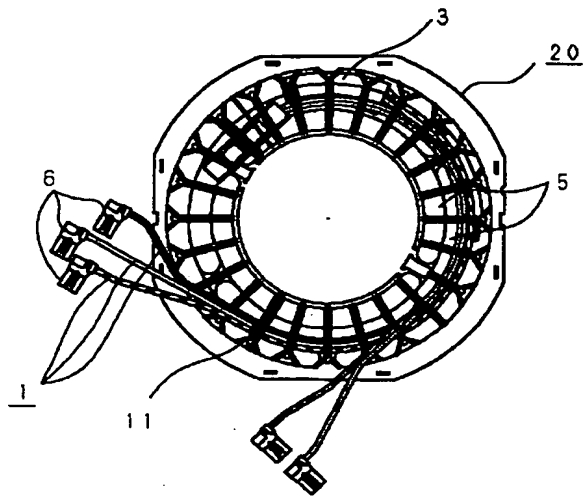
[Drawing 3]



[Drawing 4]



[Drawing 5]



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[Translation done.]